REMARKS

Claims 13, 15-23 and 34-51 are currently pending in this application, as amended. Claims 11-12, 14, 24-33 have been canceled. Claims 13, 15-19 and 21-33 have been amended to more particularly point out and distinctly claim the invention. Claims 34-51 have been added. Support for the amendments and for the new claims can be found at least in the original claims, the figures (Figs. 1-13 and 17-18, among others) and in the original Specification at page 7, line 13 – page 8, line 22; page 9, lines 1-8; page 10, line 9 – page 11, line 23; page 12, line 1 – page 13, line 26; page 14, lines 1-25; page 15, lines 2-21; page 18, line 14 – page 20, line 16; and page 19, lines 1-3. Accordingly, no new matter has been added.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 13 and 15-23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of U.S. Patent No. 6,490,055 ("Shimizu") and U.S. Patent No. 6,120,197 ("Kawamoto at al.," hereinafter, "Kawamoto").

Withdrawal of the rejections of claims 13 and 15-23 is respectfully requested in view of the foregoing amendments and for at least the following reasons.

Present Invention

The present invention is directed to a printing data processor including an editing process part that, after having received printing data with page description language (PDL) form output from a host page by page, edits the PDL data into printing data with intermediate form by page unit and analyzes all color data contained in the intermediate data of one page in order to generate page state information corresponding to the one page. The printing data processor also includes an expansion process part that performs an expansion process with respect to the intermediate data and an expansion-use-memory that is used by the expansion process while the expansion process is being performed. A real-use-quantity of the expansion-use-memory for the expansion process of one page is set based on the page state information.

In another embodiment, the present invention is directed to a printing data processor including an editing process part that, after having received printing data with page

description language (PDL) form output from a host page by page, edits the PDL data into printing data with intermediate form by page unit and analyzes all color data contained in the intermediate data of one page in order to generate page state information corresponding to the one page. The printing data processor also includes an expansion process part that performs an expansion process to expansively process the intermediate data into printable data corresponding to every page, an intermediate data memory that stores the intermediate data, a printable data memory that stores the printable data, and a system management part. When the page state information indicates that the corresponding page is color printing, the system management part makes the intermediate data memory store the corresponding intermediate data. When the page state information indicates that the corresponding page is monochrome printing, the system management part makes the expansion process part perform the expansion process and makes the printable data memory store the corresponding printable data.

The present invention is also directed to a printing data processor including an editing process part that, after having received printing data with page description language (PDL) form output from a host page by page, edits the PDL data into printing data with intermediate form by page unit and analyzes all color data contained in the intermediate data of one page in order to generate page state information corresponding to the one page. The printing data processor also includes an expansion process part that performs an expansion process to expansively process the intermediate data into printable data corresponding to every page, an intermediate data memory that stores the intermediate data, a printable data memory that stores the printable data, an expansion-use-memory that is used by the expansion process while the expansion process is performed, and a system management part that sets the real-use-quantity of the expansion-use-memory for the expansion process of one page based on the page state information. When the page state information indicates that the corresponding page is color printing, the system management part makes the intermediate data memory store the corresponding intermediate data. When the page state information indicates that the corresponding page is monochrome printing, the system management part makes the expansion process part perform the expansion process and makes the printable data memory store the corresponding printable data.

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The present invention is also directed to a printing data processor including an editing process part that, after having received printing data with page description language (PDL) form output from a host page by page, edits the PDL data into printing data with intermediate form by page unit and analyzes all color data contained in the intermediate data of one page in order to generate page state information corresponding the one page. The printing data process also includes a printing speed decision part that decides the printing speed of a current page to be printed based on the page state information of the current page being printed and the page state information of a next page that will print following the current page.

The present invention is also directed to a printing data processor including an editing process part that, after having received printing data with page description language (PDL) form output from a host page by page, edits the PDL data into printing data with intermediate form by page unit and analyzes all color data contained in the intermediate data of one page in order to generate page state information corresponding to the one page. The printing data process includes an expansion process part that performs an expansion process with respect to the intermediate data. When performing duplex printing, the expansion process part performs the expansion processes respectively corresponding to every page according to the order of printing of pages.

Shimizu

Shimizu discloses a color printer that includes an input unit for inputting color page description information, creation means for creating intermediate information for recording by analyzing color page description information which has been input, an execution unit for executing fast hardware rendering with a hardware for the intermediate information, and a switch for switching the fast hardware rendering into a software rendering in the case of a high grade color logical drawing which cannot be supported by the hardware. The printer hardware, in some embodiments, uses a "banding process" without the use of a full multi-value bit map memory and uses a "degrade method" in other embodiments. A "hard renderer" (hardware rendering circuit) 9 performs the rendering process in real time synchronously with the video transfer of a printer engine 13 of a color printer by performing a color rendering process with

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ASIC hardware, thereby implementing the banding process with smaller memory capacity. The CPU also determines whether or not a banding process can be performed or whether a full paint must be carried out. A page (band) buffer 10 is an area for storing the image expanded by PDL language, for which it is necessary to reserve a memory of 2 bands at minimum (page width x 256 or band height of about 512 x 3 (RGB) or 4 (YMCK) as the number of planes x bit depth) to permit the banding process, or a full-color bit map memory with lower resolution and/or color gradation in the apparatus requiring the image to be transferred synchronously with the printer engine, such as a laser beam printer, when the banding process is disenabled. FIG. 3 is a format for storing intermediate data created as a result of interpreting PDL data into the management RAM 7. After information (i.e., page width, banding, color, etc.) of one page is stored, the rendering process is executed for each of R, G and B planes via a paper exhausting instruction (i.e., form feed) to create a color image.

Kawamoto

Kawamoto discloses a printer color processing mode automatic control system including an information processing apparatus 1 and a printer 2. The information processing apparatus 1 includes a CPU 201 for controlling each section and executing programs; a random access memory (RAM) 202 having a work area to execute an operating system (OS), an application program, or the like; a hard disk (HD) drive 203 to store a printer color processing mode automatic control program in the embodiment; a display 204 to display data; a read only memory (ROM) 205; a floppy drive (FD) 206; an FD driver 207 for reading the program or data stored in the FD 206 to the RAM 202 or HD drive 203; a pointing device (not shown) to input; a keyboard 208; and an (centronics) interface (I/F) 209 (host). The CPU 201 executes a developing (rasterizing) process of outline fonts to a display information RAM set on the RAM 202. The color processing modes can be switched by a page unit of the print data by control information inputted from the host. Upon execution of a printing operation, the CPU 201 converts the print data received from an application into intermediate codes, forms the intermediate codes to be temporarily saved in the HD 203, stores information of a color attribute of each print data in which there is a print request from the application into the RAM 202, and preserves the information by a page unit. The print data formation to generate the print data to

be transmitted to the printer 2 and the color processing mode of each page are designated on the basis of the intermediate codes which were temporarily saved and the color processing mode information of each page which was generated and stored in RAM 202. The intermediate code is generated from the print data. Next, the CPU 201 discriminates the color attribute of the print data. When a color processing mode set at the first page before updating is the black and white mode, if the print request received from the application is a request to draw a full color image, the color processing mode of the first page is changed to full color. When no full color image is drawn until the end of the page, the apparatus is set into the black and white mode as an initial value. The apparatus assumes that when even one print request having the color attribute of full color exists in the same page, the color processing mode of such a page is set to full color.

Claim 13 and 15-23

Claims 13 and 15-23 have been amended to depend from new independent claim 34

New claim 34 recites, *inter alia*:

an expansion process part that performs an expansion process with respect to the intermediate data; and
an expansion-use-memory that is used by the expansion process while the expansion process is being performed, a real-use-quantity of the expansion-use-memory for the expansion process of one page being set based on the page state information.

Shimizu, or Shimizu modified by Kawamoto, each <u>fails</u> to disclose or suggest a printing data processor with an expansion process part that performs an expansion process with respect to the intermediate data and with an expansion-use-memory that is used by the expansion process while the expansion process is being performed, such that <u>a real-use-quantity of the expansion-use-memory</u> for the expansion process of one page is <u>set based on the page state information</u>.

In the printing data processor of the present invention, after page description language (PDL) form data per page that contains color information (i.e., one detectable page state) is output from a host, the PDL form data is edited into intermediate form data; the color information is analyzed to generate page state information; and the page state information is added into the intermediate form data. Then, in order to obtain printable printing data with bit

image form, the intermediate form data is expansively processed by using a printing process memory (see e.g., page 7, lines 11-15 and 27; page 8, lines 1-3 in Specification). The printing process memory is used not only for the expansion process, but may also be used for other process such as a former process relating with the memory before the expansion process. When the expansion process is being performed, it accounts for a part of the printing process memory. According to the page state information, if the expansion process is for monochrome printing, the part of memory will be smaller than an expansion process that is for color printing and vice versa. In general, the part for monochrome printing is about a quarter of the part for color printing. On the basis of the page state information added in the intermediate form data, the part that is the real use-quantity part of the printing process memory for expansion process is set to a minimum. Thus, when an expansion process for monochrome printing is performed with respect to one page as a current page, because the real use-quantity part of the printing process memory is smaller, the remainder of the printing process memory becomes larger. In that case, the larger remainder can be used for the above-mentioned former process of next page without waiting. Therefore, the total process time for printing can be reduced (see e.g., page 7, line 15 in the original Specification).

At best, Shimizu discloses a CPU that determines whether or not a banding process can be performed or whether a full paint must be carried out. Kawamoto fails to compensate for the deficiencies of Shimizu. Kawamoto discloses a rendering process for color printers that converts print data received from an application into intermediate codes and that stores information of a color attribute of the print data (column 8, lines 10-30). However, there is *no clear teaching* in either Kawamoto or Shimizu that a real-use-quantity of the expansion-use-memory for the expansion process of one page is set based on the page state information.

To establish *prima facie* obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art. MPEP § 2143.03. Further, to support the conclusion that the claimed invention is directed to obvious subject matter, either the reference must expressly or implicitly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to be obvious in light of the teachings of the references. MPEP § 2143.01.

Even if Shimizu were modified to include the "printing speed control" of Kawamoto, the <u>modified Shimizu device</u> would still <u>not</u> disclose <u>each</u> and <u>every</u> element of claims 13 and 15-23. Thus, <u>all</u> of the claimed elements of claims 13 and 15-23 are <u>not</u> disclosed by the modified Shimizu device. Applicant therefore respectfully submits that claims 13 and 15-23 are therefore <u>not</u> obvious under 35 U.S.C. § 103(a) in view of the combination of Shimizu and Kawamoto. Accordingly, Applicant respectfully requests that the rejection of claims 13 and 15-23 under 35 U.S.C. § 103(a) be withdrawn.

Claims 11-12, 14 and 24-33

Claims 11-12, 14 and 24-33 have been canceled, and therefore, the rejection of claims 11-12, 14 and 24-33 under 35 U.S.C. § 103(a) has been effectively rendered moot.

New Claims

The Applicant respectfully requests that the Examiner individually address each of the new independent claims. There is varying claim breadth embodied by different features of the invention recited in the independent claims that should be recognized and fully addressed by the Examiner. Additionally, the subject matter of the new independent claims was fully disclosed in the original specification and drawings, and there is also support in the original claims.

Claim 34

Independent claim 34 and dependent claims 35-39 have been added. Support for new claim 34 can be found in the original claims, Figs. 1-8 and in the original Specification page 7, lines 11-15 and 27; page 8, lines 1-3, among other places.

Claim 34 recites, *inter alia*:

> an expansion process part that performs an expansion process with respect to the intermediate data; and
> an expansion-use-memory that is used by the expansion process while the expansion process is being performed, <u>a real-use-quantity of the</u>

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expansion-use-memory for the expansion process of one page being set
based on the page state information.

Neither Shimizu or Kawamoto, alone or in combination, teaches or suggests an
expansion-use-memory that is used by the expansion process while the expansion process is
being performed, such that a real-use-quantity of the expansion-use-memory for the expansion
process of one page being set based on the page state information. Accordingly, new claims 34-
39 are patentable in view of Shimizu, Kawamoto and combinations thereof.

Claim 42

Independent claim 42 and dependent claims 43-44 have been added. Support for
new claim 42 can be found in the original claims, Figs. 1-8 and in the original Specification page
7, lines 11-15 and 27; page 8, lines 1-3, among other places.

Claim 42 recites, *inter alia*:

> a system management part that sets the real-use-quantity of the
> expansion-use-memory for the expansion process of one page based on the
> page state information; when the page state information indicates that the
> corresponding page is color printing, makes the intermediate data memory
> store the corresponding intermediate data; and when the page state
> information indicates that the corresponding page is monochrome printing,
> makes the expansion process part perform the expansion process and
> makes the printable data memory store the corresponding printable data.

Neither Shimizu or Kawamoto, alone or in combination, teaches or suggests a
system management part that sets the real-use-quantity of the expansion-use-memory for the
expansion process of one page based on the page state information and that makes the
intermediate data memory store the corresponding intermediate data when the page state
information indicates color printing and that makes the expansion process part perform the
expansion process and makes the printable data memory store the corresponding printable data
when the page state information indicates monochrome. Accordingly, new claims 42-44 are
patentable in view of Shimizu, Kawamoto and combinations thereof.

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Claim 45

Independent claim 45 and dependent claims 44-50 have been added. Support for new claim 45 can be found in the original claims, Figs. 1-8 and 17-18 and in the original Specification page 7, lines 11-15 and 27; page 8, lines 1-3, among other places.

Claim 45 recites, *inter alia*:

a printing speed decision part that decides the printing speed of a current page to be printed based on the page state information of the current page being printed and the page state information of a next page that will print following the current page.

Neither Shimizu or Kawamoto, alone or in combination, teaches or suggests a printing speed decision part that decides the printing speed of a current page to be printed based on the page state information of the current page being printed and the page state information of a next page that will print following the current page. Accordingly, new claims 45-50 are patentable in view of Shimizu, Kawamoto and combinations thereof.

Claim 40

Independent claim 40 and dependent claim 41 have been added. Support for new claims 40-41 can be found in the original claims, Figs. 1-3 and 10 and in the original Specification at page 7, line 6 – page 13, line 26, among other places.

Claim 40 recites, *inter alia*:

an expansion process part that performs an expansion process to expansively process the intermediate data into printable data corresponding to every page;
an intermediate data memory that stores the intermediate data;
a printable data memory that stores the printable data;
a system management part that, when the page state information indicates that the corresponding page is color printing, makes the intermediate data memory store the corresponding intermediate data and, when the page state information indicates that the corresponding page is monochrome printing, makes the expansion process part perform the

expansion process and makes the printable data memory store the
corresponding printable data.

Neither Shimizu or Kawamoto, alone or in combination, teaches or suggests a
system management part that, when the page state information indicates that the corresponding
page is color printing, makes the intermediate data memory store the corresponding intermediate
data and, when the page state information indicates that the corresponding page is monochrome
printing, makes the expansion process part perform the expansion process and makes the
printable data memory store the corresponding printable data. Accordingly, new claims 40-41
are patentable in view of Shimizu, Kawamoto and combinations thereof.

Claim 51

Claim 51 has been added. Support for new claim 51 can be found in the original
claims, Figs. 1-9 and in the original Specification at page 7, line 6 – page 13, line 26 and page
19, lines 1-3, among other places.

Claim 51 recites, *inter alia*:

an expansion process part that performs an expansion process with respect
to the intermediate data, when performing duplex printing, the expansion process
part performs the expansion processes respectively corresponding to every page
according to the order of printing of pages.

Neither Shimizu or Kawamoto, alone or in combination, teaches or suggests that
an expansion process part of the print processor performs an expansion process with respect to
the intermediate data, when performing duplex printing, and that the expansion process part
performs the expansion processes respectively corresponding to every page according to the
order of printing of pages. Accordingly, new claim 51 is patentable in view of Shimizu,
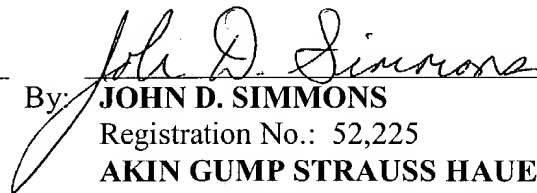Kawamoto and combinations thereof.

CONCLUSION

In view of the foregoing Amendments and Remarks, it is respectfully submitted that the present application, including claims 13, 15-23 and 34-51, is in condition of allowance and such action is respectfully requested.

Respectfully submitted,

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